

CLAIMS

What is claimed is new and desired to be protected by letters patent is set forth in the appended claims:

1. Apparatus and system for cooking, drying and peeling shellfish products comprising:
 - a) a fluid filled conk tank for separating the shellfish product from at least one of packing ice, sea shells and other large objects; and
 - b) an automated means for transporting a crate having the shellfish product therein to said conk tank;
 - c) an automated means for dumping the shellfish product into said conk tank from the crate; and
 - d) an automated means for removing the crate therefrom.
2. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, further comprising:
 - a) a boiler system for supplying heated brine and for cooking the shellfish product therein; and
 - b) an automated means for transferring the shellfish product from said conk tank to said boiler system.
3. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 2, wherein said boiler system comprises:
 - a) a brine mixing tank including a means for introducing water therein and a means for introducing salt therein to create a brine solution of a predetermined concentration in which the shellfish product is to be cooked;
 - b) a primary seafood boiler to retain brine obtained from said brine mixing tank and maintain said brine at a constant, predetermined temperature; and
 - c) a conduit communicating between said brine mixing tank and said primary seafood boiler for the selective transport of brine to the primary mixing tank.
4. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, wherein said boiler system further comprises one or more auxiliary boilers

connected in line with said conduit for heating said brine to the desired temperature and storing it therein, wherein said stored brine is able to replenish used brine that has been removed from said primary seafood boiler.

5. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, wherein said primary seafood boiler further includes a means for agitating said brine and other contents therein.

6. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 5, wherein said agitation means includes at least one paddle wheel at the surface of said brine for moving the shellfish product evenly therethrough.

7. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 5, wherein said agitation means includes at least one jet nozzle for circulating the brine and product within the boiler.

8. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, wherein said primary seafood boiler further includes means for selectively maintaining and monitoring a specific temperature of said brine therein.

9. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, wherein said primary seafood boiler further includes salinity monitoring sensors for monitoring the salinity concentration of said brine thereby ensuring that the seafood product is being cooked in desired brine mix.

10. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 2, further comprising a broth processing system wherein used brine is extracted from said primary seafood boiler and transported to said broth processing system for preparation into a seafood flavored broth.

11. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 10, further comprising broth storage tanks for the storage of said seafood flavored broth.

12. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 10, further comprising a broth packaging system for packaging said broth for at least one of sale and use in a commercial market.

13. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 2, further comprising a spray drying system wherein used brine is extracted from said primary seafood boiler and injected as a fine mist into a heated furnace where instantaneous crystallization occurs creating a solid product to be used as a seafood flavored salt.

14. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 2, further comprising:

- a) at least one dryer for dehydrating the shellfish product; and
- b) an automated means for transferring the shellfish product from said boiler system to said dryer.

15. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 14, wherein said means for transporting said shellfish product from the said boiler system to said dryer is a seafood dryer conveyor having a first lower end disposed at a bottom portion of said primary seafood boiler and a second end extending over and beyond an opposing sidewall of said dryer where it assumes a substantially horizontal orientation and terminates upon introduction to said dryer.

16. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 15, wherein said seafood dryer conveyor further includes a plurality of high speed fans positioned over said conveyor and along a length thereof, said plurality of high speed fans cool the shellfish product and stop the cooking process.

17. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 15, wherein said seafood dryer conveyor further includes a plurality of spreader bars traversing the width of said seafood dryer conveyor and disposed at a predetermined distance thereabove at a height sufficient to permit individual pieces of shellfish to pass thereunder but that prevents passage of stacked shellfish thereunder thereby

causing all shellfish pieces to be positioned on said conveyor and assuring the shellfish product is evenly spread thereon for more efficient cooling.

18. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 15, wherein said seafood dryer conveyor further includes a plurality of rakes for turning said shellfish product to further ensure at least one of uniform drying and uniform cooling thereof.

19. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 15, wherein said seafood dryer conveyor is enclosed to prevent exposure to airborne contaminants.

20. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 15, further including a transport portion of said seafood dryer conveyor that is composed of a mesh-like belting to permit the passage of air therethrough.

21. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 14, further comprising a means for supplying heat to the dryers by capturing heat generated by said boiling and broth systems and transferring it thereto.

22. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 21, wherein dryer heat supply means includes a manifold integral with said boiler system and in communication with the dryers to scavenge the heat from the heat generating boilers and transfer it thereto.

23. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 21, wherein said dryer heat supply further includes an air return system to return air to said boiler system from said dryers using fans or blowers to maintain constant air flow and recirculation.

24. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 14, wherein said dryers include a means for moving and rotating said shellfish product within said dryers during the drying process.

25. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 24, wherein said product moving and rotating means is a vertically stacked conveyor system having a plurality of staggered, parallel conveyors spaced apart one above the other and each moving in alternating directions, the shellfish product is introduced into the dryer on the top conveyor and falls off upon reaching an end thereof and lands on a second conveyor subjacent thereto thereby effectively rotating said shellfish product which then further travels in a second opposite direction until falling onto a third conveyor subjacent to said second conveyor and said shellfish product further travels along said third conveyor until reaching a final conveyor subjacent to said third conveyor that transports the shellfish product to another dryer.

26. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 24, wherein said product moving and rotating means is a vertically stacked conveyor system having a plurality of staggered, parallel conveyors spaced apart one above the other and each moving in alternating directions, the shellfish product is introduced into the dryer on the top conveyor and falls off upon reaching an end thereof and lands on a second conveyor subjacent thereto thereby effectively rotating said shellfish product which then further travels in a second opposite direction until falling onto a third conveyor subjacent to said second conveyor and said shellfish product further travels along said third conveyor until reaching a final conveyor subjacent to said third conveyor that transports the shellfish product to a peeling device.

27. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 24, wherein said product moving and rotating device comprises a spiral platform having a substantially cylindrical chute extending medially therethrough wherein an orbital motion of said spiral platform spirals the shellfish product upwards until reaching a top level where it enters said chute and falls to the bottom thereby rotating said product which is subsequently reloaded onto said spiral platform as the cycle repeats for a predetermined number of times.

28. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 14, wherein said dryers further include vacuum bars running along the bottom portion of said dryer to vacuum accumulated shells and shellfish product that may have fallen off the conveyors.

29. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 14, wherein said dryers further include sensors for detecting a moisture content within said shellfish product to ensure complete dehydration and to eliminate any pathogens therefrom.

30. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 14, further comprising a product transfer system which utilizes suction to vacuum said shellfish product from one device to another.

31. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 30, wherein said product transfer system is utilized to move said shellfish product from said spiral dryer to a peeler.

32. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 14, wherein said dryer further comprises conveyor rakes to stir said shellfish product during drying.

33. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 32, wherein moisture sensors activate said conveyor rakes after sensing the shellfish product has an amount of moisture therein greater than a threshold moisture level.

34. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 33, wherein said dryer further include temperature control means.

35. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 34, wherein said temperature control means comprises:

- a) thermostats; and
- b) regulators.

36. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 14, wherein said dryers further include air contaminate sensors for detecting potential contaminates and toxins within said dryer.

37. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 36, further comprising an alarm and notification mechanism connected to said air contaminate sensors to notify an operator of said system to the existence of a potentially hazardous condition.

38. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 14, wherein said dryers include a video monitoring system to allow an operator to observe the operation within the dryers.

39. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 14, wherein said dryers further include rheostats.

40. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 14, further comprising:

- a) at least one peeling device for removing at least one of heads, shells and tails from the shellfish product; and
- b) an automated means for transferring the dried shellfish product from said dryer into said peeling device and for removing it therefrom.

41. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 40, wherein said peeling device comprises:

- a) an inner compartment having a screened bottom;
- b) an outer compartment;
- c) a blade member that spins within said inner compartment so that the cleaned shellfish product rides along the smooth walls of said inner compartment while the heavier uncleaned shellfish product falls onto said screened bottom to continue cleaning of de-shelling process.

42. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 41, wherein said peeling device further comprises at least one of:

- a) means for separation of debris and shells from finished product by vacuum extraction and loading by-product into at least one of packages, drums and storage bins;

- b) means connected serially between said dryer and said product transfer system for grading product by size;
- c) means for auto-unloading of finished product optionally connected to said peeler;
- d) mobile tilting unit optionally connected to said peeler;
- e) a stationary stand optionally connected for supporting said peeler;
- f) screen sweeper optionally connected within said peeler for sweeping said screens; and
- g) air jets optionally positioned with said peeler for injecting air therein.

43. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, further comprising an automated means of separating shells and debris from a finished seafood product.

44. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, further comprising an automated means of grading product by size.

45. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, further comprising an automated means of packaging shells and dust.

46. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, wherein said automated means for transporting the crated product to said conk tank comprises:

- a) a conk tank conveyor system having a first loading end and a second dumping end, said dumping end extending above and beyond the edge of said conk tank;
- b) a dumping cage disposed proximal to said dumping end of said conveyor system positioned in a manner conducive to catching said crate after it falls off said dumping end so the open top portion of the crate is oriented towards said conk tank thereby emptying the contents of said crate therein, said dumping cage being substantially open so as not to restrict passage therethrough of said shellfish product; and
- c) a mechanical means for ejecting said crate from said dumping cage.

47. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, wherein said conk tank comprises:

- a) a watertight housing having sidewalls and an open top;
- b) a substantial quantity of water retained within said housing; and
- c) means for agitating said water and lighter objects within said conk tank.

48. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 2, wherein said means for transferring the shellfish product from said conk tank to said boiler system is a substantially inclined conk tank conveyor having a first lower end located at a bottom portion of said conk tank, and a second, upper end extending above and beyond the opposing sidewall of said conk tank housing so as to extend over said primary seafood boiler thereby permitting the shellfish product to fall therein upon reaching the end of said conk tank conveyor.

49. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, further comprising a computerized monitoring system and central data base to oversee operational phases of said system and apparatus, said computerized monitoring system and central database comprising at least one of:

- a) a video and audio monitoring device;
- b) a chemical detection sensor;
- c) a product tracking device;
- d) production schedule monitor;
- e) a scale for determining gross weights of product;
- f) product yield device;
- g) critical control point sensor;
- h) product water activity sensor;
- i) moisture content sensor;
- j) an air and water heat sensor;
- k) heat, water and air flow control system;
- l) a salinity monitor;
- m) a plurality of timers and controls for timing and controlling each of the cooking phase, drying phase and peeling phase;
- n) a Hazardous Analysis Critical Control Point (HACCP) guidelines and regulation system;

- o) a system for determining compliance with at least one of government agency inspection and production requirements;
- p) quality control monitoring system;
- q) troubleshooting system able to troubleshoot operational problems of said system and apparatus;
- r) means for providing good manufacturing process tips to an operator of said system and apparatus;
- s) raw product testing system;
- t) at least one alarm and notification system;
- u) means for grading product size;
- v) a thermostat;
- w) a regulator;
- x) LED control panel for controlling said system and apparatus; and
- y) rheostats.

50. A dumping cage for discharging crated seafood product into a conk tank comprising:

- a) means for receiving said crated seafood product;
- b) means for displacing the crate whereby the crate is up-ended to discharge the contents; and
- c) means for removing the crate from the receiving means.

51. A product delivery apparatus for conveying crated seafood product to a conk tank comprising:

- a) means for receiving said crated seafood product; and
- b) means for elevating said crated seafood product to the upper rim of a conk tank.

52. A system for delivering raw crated seafood product and discharging said product into a conk tank comprising:

- a) a product delivery apparatus; and
- b) a dumping cage for discharging said crated seafood into a conk tank.

53. A conk tank for retaining raw seafood product and water therein comprising at least one of:

- a) means for circulating water under pressure;
- b) means for testing the raw seafood product;
- c) means for agitating the water and raw seafood product in said tank;
- d) means to prevent passage of ice while transferring raw seafood product therefrom; and
- e) sensor means incorporated therein for detecting foreign substances and chemicals within said tank.

54. A method for processing raw seafood product comprising:

- a) delivering raw seafood product to a heated receptacle having a brine solution therein;
- b) heating the receptacle; and
- c) recovering heat used for heating the receptacle for later use thereof.

55. The method as recited in Claim 54 wherein said step of delivering further comprises taking raw seafood product from a lift basket and conveyor belt.

56. The method as recited in Claim 55 wherein said step of taking raw seafood product further comprises the steps of:

- a) supporting a crate having raw seafood product therein;
- b) conveying the crate of product to an input aperture of a boiler; and
- c) discharging the raw seafood product from the crate into the boiler.

57. The method as recited in Claim 55 wherein said step of taking raw seafood further comprises the step of extending a conveyor belt having two distal ends and a motorized means for rotating the belt, wherein a first distal end of the conveyor belt terminates at an input aperture for the boiler.

58. The method as recited in Claim 54 further comprising the step of mixing the raw seafood product, in a brine mixing tank in communication with the heated receptacle.

59. The method as recited in Claim 54 further comprising the step of holding in auxiliary tanks a brine solution, wherein the auxiliary tanks are in communication with the heated receptacle.

60. The method as recited in Claim 54, further comprising the step of drying the processed seafood from the heated receptacle.

61. The method as recited in Claim 60, further comprising the step of incorporating the re-circulated heat from said step of heating for use in said step of drying.

62. The method as recited in claim 60, further comprising the step of peeling the dried shellfish product using a peeling device.

63. The method as recited in claim 62, wherein the shellfish is a hard-shelled shellfish and said step of peeling further comprises the steps of:

- a) transferring partially peeled hard-shell shellfish from the peeling device to a freezer device;
- b) freezing the partially peeled hard-shell shellfish in the freezer device causing any shell still attached thereto to become brittle;
- c) further transferring the frozen partially peeled hard-shell shellfish to at least one of the peeling device and a second peeling device;
- d) further peeling of the hard-shell shellfish to remove any remaining shell therefrom.

64. The method as recited in claim 63, wherein said step of freezing results in hard-shell shellfish meat that has a greater durability and allows for a greater yield in final product.

65. The method as recited in Claim 54, further comprising the step of transferring the brine solution under predetermined conditions to a broth processing system.

66. The method as recited in Claim 65, wherein said step of transferring to the broth processing system further comprises the steps of:

- a) storing the broth in a plurality of tanks; and

- b) packaging the broth.

67. The method as recited in Claim 54, further comprising the step of passing air through a sealed conduit that connects a delivery mechanism with the receptacle and causing the air to be heated.

68. The method as recited in Claim 54 further comprising the step of drying the processed seafood using a spray drying system, said step of drying further comprises the steps of:

- a) extracting brine from the heated receptacle;
- b) injecting the extracted brine into at least one of a heated furnace and hopper as a fine mist;
- c) dehydrating the injected mist;
- d) creating a solid product to be used as a seafood flavored salt or additive.

69. A broth processing system wherein the brine solution from a seafood boiler is transported to holding tanks prior to packaging as a brine broth.

70. A food flavoring byproduct system wherein the brine solution from a seafood boiler is extracted from the heated receptacle and injected into a heated furnace or hopper as a fine mist where it is almost immediately dehydrated thereby creating a solid product to be used as a seafood flavored salt or additive.

71. A peeling device in communication with a dryer, wherein said peeling device is comprised of:

- a) a loading device
- b) a screen sweeper
- c) a blade; and
- d) a tilting unit.

72. A peeling device in communication with a dryer, wherein said peeling device is comprised of:

- a) a stationary stand;
- b) an unloading device;

- c) a blade; and
- d) a screened aperture providing access.

73. A spiral conveyor dryer in communication with a peeling device, wherein said spiral dryer cycles the product from a low end to a high end as heated air is passed over said product before dropping said product to the low end.

74. A stacked conveyor dryer in communication with a peeling device, wherein said stacked conveyor drier moves the product from one level to another as heated air is passed over said product.

75. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 15, further comprising at least one pair of rollers positioned vertically on top of one another and having a predetermined gap therebetween, wherein said at least one pair of rollers is positioned at a distal end of said seafood dryer conveyor and prior to said at least one dryer.

76. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 75, wherein said pair of rollers is able to at least one of crush and crack shells of the shellfish product passing therethrough to allow for a more efficient dehydration thereof

77. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 76, wherein said at least one pair of rollers are adjustable thereby producing different sized gaps in order to accommodate a plurality of different types of shellfish therethrough.

78. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 40, wherein said peeler partially shells the shellfish product and further comprises:

- a) a freezer device for freezing said partially shelled shellfish product and causing any remaining shells to become brittle;
- b) a first means for transferring said partially shelled shellfish product to said freezer device;

- c) a second means for transferring frozen partially shelled shellfish product to a further peeling device for complete removal of said remaining shells.

79. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 78, wherein said further peeling device is at least one of said peeler and a second peeler device.

80. Apparatus and system for cooking, drying and peeling shellfish products to produce a shellfish flavored oil comprising:

- a) means for transporting raw shellfish product for processing thereof;
- b) means connected to said transporting means for cooking and dehydrating said raw shellfish product;
- c) means for peeling said cooked and dehydrated shellfish product to produce shellfish byproduct;
- d) means for using said shellfish byproduct to produce a shellfish flavored oil able to be consumed by human beings.

81. Apparatus and system for cooking, drying and peeling shellfish products to produce a shellfish flavored oil as recited in claim 80, further comprising means for adding a further flavor element to said shellfish flavored oil.

82. Apparatus and system for cooking, drying and peeling shellfish products to produce a shellfish flavored as recited in claim 81, wherein said further flavor element is at least one of a lemon flavor, garlic flavor, spice flavor, butter flavor and any other flavor element for human consumption.

83. Apparatus and system for cooking, drying and peeling shellfish products to produce a shellfish flavored oil as recited in claim 80, wherein said using means comprises:

- a) a container for retaining a neutral oil therein;
- b) means for pulverizing said byproducts and for transferring said pulverized byproduct to said container thereby forming a mixture of pulverized byproduct and neutral oil;
- c) means disposed beneath said container for heating said mixture at a low heat;

- d) a filtering device for filtering said heated mixture in order to produce said shellfish flavored oil.

84. Apparatus and system for cooking, drying and peeling shellfish products to produce a shellfish flavored oil as recited in claim 83, wherein said neutral oil includes at least one of Soy, Canola, Vegetable, Olive and Medium Chain Triglycerides (MCT) oil.

85. Apparatus and system for cooking, drying and peeling shellfish products to produce a shellfish flavored oil as recited in claim 80, wherein said byproduct includes heads, tails, legs and shells of said shellfish that were removed by a peeling device and wherein said shellfish flavor originates from shellfish meat in cavities in each piece of byproduct.

86. Apparatus and system for cooking, drying and peeling shellfish products to produce a shellfish flavored oil as recited in claim 80, wherein said filtering device is at least one of a cheesecloth and a screen formed from a fine mesh.

87. A method for producing a shellfish flavored oil comprising the steps of:

- a) transporting raw shellfish product for processing thereof;
- b) cooking and dehydrating the raw shellfish product;
- c) peeling the cooked and dehydrated shellfish product to produce shellfish byproduct;
- d) pulverizing the shellfish byproduct into a powder form;
- e) transferring the pulverized byproduct to a container having a neutral oil contained therein to form a mixture of pulverized byproduct and neutral oil;
- f) heating the mixture in the container on a low heat for a predetermined amount of time;
- g) extracting flavor from the pulverized byproduct into the neutral oil; and
- h) filtering the mixture thereby producing a shellfish flavored oil.

88. The method for producing a shellfish flavored oil as recited in claim 87, further comprising the step of adding a further flavor element to the shellfish flavored oil.

89. The method for producing a shellfish flavored oil as recited in claim 87, wherein said step of peeling further includes the step of removed at least one of a head of the shellfish, a tail of the shellfish, at least one leg of the shellfish and de-shelling the shellfish.

90. The method for producing a shellfish flavored oil as recited in claim 87, wherein said neutral oil includes at least one of Soy, Canola, Vegetable, Olive and Medium Chain Triglycerides (MCT) oil.

91. The method for producing a shellfish flavored oil as recited in claim 87, wherein said step of filter further comprises passing the mixture through at least one of a cheesecloth and a fine mesh screen.

92. The method for producing a shellfish flavored oil as recited in claim 87, wherein said step of pulverizing is performed in at least one of a mill and a grinder.

93. The method as recited in claim 63, wherein the hard-shell shellfish is at least one of crawfish and rock shrimp.